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# Body Image Distortion in College Females: Effects on Exercise Identity and Commitment

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*Body image concerns have been related to behavioral aspects of exercise. This study examined the psychological aspect of exercise on role identity. It was hypothesized that college females who overestimated percentage body fat were more likely to identify exercise as an integral self-concept and commit strongly to exercise than correct or underestimators. Twenty-five undergraduate females, never diagnosed with an eating disorder, completed an Exercise Identity Scale and a Commitment to Exercise scale. Body fat was assessed using calipers at three body sites. Body image distortion is prevalent among normal populations but shows no significant relation to exercise identity and commitment. The slight positive correlations between distortion and identity and commitment could increase with higher sample size.*

Eating disordered individuals have often been examined for body image distortion and excessive exercise habits. However, the degree to which these phenomena exist in non-clinical populations has only begun to be assessed. Knowledge of non-patient populations would help to define the levels at which body image distortion and excessive exercise should be considered unhealthy and classified as eating disorder symptomology.

Body image distortion is among diagnostic criteria of anorexia and bulimia. Attitudinal body dissatisfaction, as opposed to a sensory problem, is largely responsible for this distortion (Cash & Deagle, 1997). Gardner & Bokenkamp (1996) focused on body image distortion as a defining feature of anorectic and bulimic tendencies. A video distortion technique gauged the level of body image distortion 35 female eating disorder subjects and an undergraduate sample of 15 males and 18 females serving as a control. Each participant was asked to rate images of himself or herself as "too wide" or "too thin." Control

participants accurately judged full body size, while the clinical sample consistently overestimated full body size. For both the control and experimental groups, the correlation between the weight and body size estimation was negative, indicating that the less the subject weighed the greater the size overestimation.

Gardner and Bokenkamp's (1996) control group indicates the non-clinical individuals do not overestimate body size. However, studies focusing solely on non-clinical samples have obtained opposing results. Auchus, Kose, and Allen (1993) recruited 49 participants, ranging from 22-47 years, from a health club. The sample included 29 females and 20 males. In a Modified Video Camera Technique, participants viewed their bodies in a series of images either ascending or descending in size. Thirty participants identified the image from the set, which accurately represented size; however, 20 chose a distorted image.

Klesges (1983) also found that body image disturbance is a common phenomenon among

females, regardless of whether they have been diagnosed with an eating disorder. One hundred and twenty-one female college students rated themselves as underweight, normal weight or over weight and estimated the difference in pounds between actual weight and perceived ideal weight. Fifty-eight percent of normal weight females perceived themselves as overweight. Seventy percent of under weight females perceived themselves to be normal weight, and 20 percent actually reported themselves to be overweight. Overweight females exhibited the opposite trend and underestimated their degree of heaviness.

In Klesges' (1993) study, normal weight females viewed themselves as being 5 pounds overweight, a distortion criterion of only a small percentage of the full body weight. However, the bulimic and anorexic samples of Gardner and Bokenkamp" (1996) study has had distortion criterion 10-15 percent larger than actual size. These results indicate that body image distortion exists as a continuum across both non-clinical and pathological populations and highly distorted criterion indicate eating disorder tendencies.

Eating disordered individuals are also characterized by placing an unusual emphasis on exercise. Excessive exercise may be defined as "physical activity that is extreme in frequency and duration, relatively resistant to change, and likely to be accompanied by an irresistible impulse to perform even in the face of injury, fatigue, or other personal demands" (Davis, Brewer, & Ratunsey, 1993, p.612). Eating disordered patients have a greater chance of being classified as excessive exercisers than non-clinical patients. (Kron et al., 1978; Long & Smith, 1990 cited in Davis et al.). For primary eating disorders, strenuous exercise is an expression of the disorder; however, the pathway is reversed for secondary disorders. Secondary disorders often develop "as result of participating in highly competitive athletic activities in which low body weight is stressed as ideal for optimal performance" (Leon, 1991, p.221 cited in Wolf & Akamatsu, 1994).

Wolf and Akamatsu (1994) attempted to further clarify the relationship between exercise and eating disorder symptomology by examining 120 male and 168 female undergraduates. Results showed as compared to female non-exercisers,

female exercisers exhibited significantly greater anorectic/bulimic eating attitudes and a greater drive for thinness. However, these exercisers displayed the behavioral symptoms of secondary eating disorders and not the full range of psychopathology associated with primary eating disorders.

Eklund and Crawford (1994) examined the relationship between social physique anxiety and exercise in 94 college-age females. The Reasons for Exercise Inventory (REI) and Social Physique Anxiety Scale (SPAS) were administered. Skinfolds were assessed with Lange calipers at four body sites, triceps, abdomen, superilium, and thigh, and mean body fat percentage was found to be about 22 percent. SPA correlated significantly with self-perceptual reasons for exercise such as exercising for body tone ( $r = .30$ ,  $p < .004$ ), for weight control ( $r = .57$ ,  $p < .001$ ), and for improving physical attractiveness ( $r = .26$ ,  $p < .014$ ). Fredrick and Morrison (1996) further investigated the relationship between SPA and attitude and adherence towards exercise. They found that those subjects with high scores on SPAS exhibited an emotional profile similar to that of addicted exercisers.

The study continued the examination of body image distortion and exercise attitudes in non-clinical population. While previous studies have utilized video camera techniques and weight estimations to measure distortion, this study utilized the difference between an individual's estimated body fat composition and the actual composition. This was a unique measure because it asks individuals to estimate their body fat composition based on their picture of the average body size. Since the media portrays the average individual as much smaller than the actual average person, any resulting distortions are a function of inaccurate perceptions of self and the average physique. To measure the role of exercise in an individual's life, both Wolf and Akamatsu (1994) and Eklund and Crawford (1994) measured the frequency of its occurrence. However, adherence to exercise is unrelated to body-focused motives (Ryan, Fredrick, Lepes, Rubio, & Shelton, 1997). Therefore, it is important to expand upon a behavioral role and examine the physiological role of exercise. When viewed as a role-identity or integral part of the self-concept, exercise gives meaning to an

individual's past behaviors and motivates future behaviors. As compared to a measure of exercise frequency, a psychological measure better distinguishes between exercisers who lack excessive identification and those who compulsively exercise for self-presentational reasons fostered by a distorted body image.

It was hypothesized that a college female who overestimated her percentage body fat would be more likely to identify exercise as an integral part of the self concept and to strongly commit to exercise than a college female who correctly estimated or underestimated her percentage body fat. The degree of overestimation would vary directly in a proportional relationship with intensity of exercise identification and commitment. Twenty-five college age females who have never been diagnosed with an eating disorder participated in the study. The independent variable, the difference in the estimation of percentage body fat and the actual percentage, was a subject variable manipulated by the participants. A professional wellness coordinator used Lange calipers to take skinfolds at the triceps, superilium and thigh, and actual body fat composition was computed from these measurements. The dependent variable was the role of exercise in an individual's life. It was further subdivided into exercise identification, assessed by the Exercise Identity Scale, and commitment, assessed by the Commitment to exercise scale.

## METHOD

### Participants

Twenty-five females, ages 18 through 21 years, participated in the study. Students from all levels of psychology courses volunteered to complete the experiment for an incentive of extra credit. Ninety-six percent of the participants were Caucasian, and 4% were African-American. Data from participants who had been clinically diagnosed with an eating disorder was excluded.

### Materials

The Commitment to Exercise Scale assessed individuals' psychological commitments to exercise. The scales measure the influence of exercise on feelings of well being, adherence to exercise during adverse conditions, and the

degree to which exercise interferes with social commitments. The scale included a two-factor, obliquely rotated solution. The first factor focused on the obligatory aspect of exercising, or the necessity of a structured exercise routine for the maintenance of psychological well being. The aspect was measured by questions such as, "Do you have a set routine for your exercise sessions?" The second factor described the pathological aspect of exercising, or the degree to which exercise takes priority over social obligations and continued during adverse conditions. This aspect was measured by questions such as, "Do you continue to exercise at times when you feel tired or unwell?" The correlation coefficient between the factors is .42, and Cronbach's alpha coefficient is .77 for the scale. For each item, bipolar adjectives, such as "never" and "always" or "no routine" and "strict routine," formed the endpoints of a 120 mm horizontal line, and the distance from the beginning of the line to the participant's mark was the score for each item (Davis et al, 1993).

### Procedure

Participants were requested to report to a classroom in the science building where they completed informed consent procedures immediately upon arrival. They were informed that completion of the project would take no longer than 15 minutes, that they would be answering questions about body image and exercising, and would have body fat computed by an athletic trainer. They were ensured that their responses and identity would be confidential, and they were aware they had volunteered for the project and could terminate participation at any time. Participants also provided demographic characteristics including gender, race, and age.

To give participants a concept of body fat composition, they were given a sheet stating, "The classifications for percentage of body fat levels of females ages 16 through 70 are 16%-25%: excellent, 26%-29%: good or fair, and over 30% needs improvement (J. J. Joralemon, personal communication, February 23, 1998). Students reported their best estimates of their individual body fat compositions. Students then completed the Exercise Identity Scale (Anderson & Cychosz, 1994) and the Commitment to Exercise Scale (Davis et al., 1993).



In a private room with a female experimenter present, a male professional wellness coordinator measured percentage body fat of the participants by taking skinfolds at three body sites; the triceps, superilium region at the hip, and the lower thigh. The percentage body fat in adult females on a chart developed by Pollock, Schmidt, and Jackson (1980). Abiding by APA ethics standards, the participants were not told their body fat percentages due to the possible anxiety this information can cause.

Finally, participants were given a slip of paper asking them to indicate by circling "yes" or "no" whether they had ever been clinically diagnosed with an eating disorder. They were also given a debriefing statement thanking them for participating and informing them of where the results of the study would be presented and how to contact the experimenters for questions. They were asked to refrain from sharing information about the experiment with other individuals.

## RESULTS

Results indicate the existence of body image distortion in this sample. Twenty-two participants overestimated their percentage body fat. Eighteen participants estimated their body fat to be in the good/fair range; however, 83.33% were actually in the excellent range. Actual body fat percentages were significantly negatively correlated with the amount of overestimation ( $r = -0.749$ ,  $p, .001$ ). For the majority of participants, the lower the female's body fat percentage was, the greater she tended to overestimate. Though not significant, percentage body fat overestimation correlated slightly with the Identity and Commitment scales in a positive direction (see Table 1).

Scores on the Exercise Identity and Commitment scales showed the variable role of exercise in this sample. The mean score on the Exercise Identity Scale was 29.89 out of a possible score of 54, with a low score indicating strong identity. Scores ranged from 9 to 54 ( $SD = 4.19$ ). The mean score of 960 mm, with a high score indicating strong commitment. Scores range from 37.00 to 542.00 mm ( $SD = 226.54$ ).

The results further validated the Commitment to Exercise Scale by showing

significant positive correlation among the three factors, obligatory, pathological, and total (see Table 1). The Commitment to Exercise Scale was correlated significantly with the Exercise Identity Scale in a negative direction ( $r = -0.863$ ,  $p, .001$ ).

## DISCUSSION

Results indicate that body image distortion is prevalent among normal populations. Results also show the broad range of identity and commitment to exercise in a normal population. Some individuals place almost no emphasis on exercise, while others exhibit unhealthy, excessive commitments. While body image distortion and excessive exercise exist simultaneously in eating disordered individuals, the presence of one appears to have no relation to the presence of the other in normal populations. This finding is counterintuitive to what was expected; however, overestimation showed slight positive correlations with the scales.

### Overestimation

One interesting finding showed that overestimation of percentage body fat significantly correlated with actual body fat in a negative direction, indicating that the less body fat the participant had, the more she tended to overestimate. Gardner and Bokenkamp (1996) found that their non-clinical control group exhibited this same tendency. They believe this trend was due to distorted judgment rather than actual sensory problems. In our sample, these results may indicate that college age females are more likely to judge their physique to be below the ideal standard, even if in actuality, they equal or exceed this standard.

Another finding was a significant negative correlation between the Exercise Identity Scale, The Commitment to Exercise Scale, and its subscales. It was expected that the scales measured similar tendencies toward exercise; however, this correlation indicated that the two scales measure very different aspects of exercising, Identity focuses on exercise as a positive role identity, while commitment centers on the anxiety experienced when one's routine is

TABLE ONE

Pearson Correlation Matrix on Exercise Identity and Commitment Scales, Actual Body Fat Percentage, and Degree of Body Fat

Estimation- Actual % Fat	Identity	Obligatory	Pathological	Commitment
<b>Total</b>				
Estimation- Actual %Fat	-			
Identity	0.072	-		
Obligatory	0.086	-0.825*	-	
Pathological	0.110	-0.814*	0.901*	-
Commitment Total	0.089	-0.863*	0.983*	0.957*
-				
Actual % Body Fat	-0.749*	-0.031	-0.035	-.0016
-0.029				

**Note.** \*Correlations indicate statistical significance ( $p, .001$ ) using the Bonferroni probabilities test. Multiple correlations were run, so the Bonferroni test was used to correct for these multiple tests.

disturbed and the degree to which exercise takes priority over social obligations and is continued during adverse conditions. This negative correlation re-emphasizes the idea that the individual sense that their level of commitment may be excessive, may be hesitant to use exercise to describe their self-concept to others. Perhaps body image overestimation serves as a rationalization of their pre-occupation and overly strong commitments to exercise. Fredrick and Morrison (1996) found that individuals who scored high on the Social Physique Anxiety Scale were more likely to endorse extrinsic motives for exercise. Their results would seem to be further evidence for this trend. The high-scorers perhaps had a high commitment coupled with a low identity, causing them to select extrinsic motives as aspects of exercising should note the distinction between identity and commitment.

The fact that participants exhibited a wide range of identification and commitment to exercise indicates that the sampling strategy

provided an unbiased sample for the measurement of exercise variables. Also important to the sample characteristics was the focus on college age females. Exercise and the body image are often important to members of this age group. This emphasis may be due to higher societal pressures for positive peer evaluation and sex appeal in the college setting. The exaggeration of these phenomena in college age females presents convincing evidence for their existence; however, they may not be as prevalent in other populations, such as different age cohorts.

Body fat percentages were taken while the participants were fully clothed. This systematic error may have inflated results somewhat. Another factor which may have skewed the results was the possibility the participants had prior knowledge of their body fat. Athletes often have knowledge of such information, and participants also could have been informed of their body fat composition by

a doctor during a medical examination. While participants indicated if they had ever been diagnosed with an eating disorder, one must take into account the existence of undiagnosed eating disorders as well. This study could be greatly improved with a larger sample size, which would minimize the impact of undiagnosed eating disorders on results.

While Gardner and Bokenkamp (1996) found that eating disordered individuals overestimate body size by 10 to 15 percent, the degree of overestimation in the present study was not as large. This comparison indicates that while body image distortion exists in normal populations, it is not exhibited to as great a degree as in eating disordered populations. As compared to Kleges' (1983) study of non-clinical individuals, a larger percentage of the present sample overestimated body size, a difference perhaps due to methodological differences.

Future research could concentrate on utilizing a larger sample size and more accurate measurements of body fat. This might contribute to a more significant correlation between overestimation, exercise identity, and commitment. The prevalence of body image distortion in males and other age groups could also be explored. Typically, this phenomenon has been associated with younger females; however, it may exist in other groups. Another related topic could involve the correlation between exercise identity and commitment and distorted eating attitudes. We have all seen females that we know are under eating. Researching this topic could reflect upon participant's perceptions of healthy eating in comparison to their actual recommended caloric intake.

The results of the study are not only indicative on the profound importance individuals place upon their body image, but also the extensive effects of societal pressures on what should be considered the "ideal" body.

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